



**University of  
Zurich<sup>UZH</sup>**

**Zurich Open Repository and  
Archive**

University of Zurich  
University Library  
Strickhofstrasse 39  
CH-8057 Zurich  
[www.zora.uzh.ch](http://www.zora.uzh.ch)

---

Year: 2009

---

## **A walk to kindergarten project in Switzerland: needs assessment, comparison of outcome assessment methods and follow-up over three years**

Jimmy, G ; Ruch, N ; Martin-Diener, E ; Martin, B W

**Abstract:** Background: Parents in a suburban community in Switzerland were concerned about the safety of their children when walking to kindergarten. A steering group was formed and a project started with the aim of improving conditions for safe walking to kindergarten and preventing the increase of car use for transport to kindergarten. Methods: Individual interviews, group interviews and questionnaires were used to assess the needs of teachers, pupils and parents respectively. Baseline counts of kindergarten pupils arriving by car, school bus or on foot were obtained using three different methods. Counts and parent questionnaires were repeated for follow-up after one year and three years. Results: The involvement of parents, teachers and kindergarten children for the needs assessment was crucial to the project implementation and acceptance. The young children's self-report as well as counts by older primary school students turned out to be reliable methods for outcome measurement. The percentage of children brought by car in the morning remained similar after one year with some reduction being observed at 3-year follow-up. Conclusions: Parents, kindergarten children and school children made significant contributions to this walk to kindergarten project. To achieve their full potential, project activities have to continue over several years.

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-29145>

Journal Article

Originally published at:

Jimmy, G; Ruch, N; Martin-Diener, E; Martin, B W (2009). A walk to kindergarten project in Switzerland: needs assessment, comparison of outcome assessment methods and follow-up over three years. *Schweizerische Zeitschrift für Sportmedizin und Sporttraumatologie*, 57(2):51-55.

Gerda Jimmy<sup>a</sup>, Nicole Ruch<sup>a</sup>, Eva Martin-Diener<sup>a</sup>, Brian W. Martin<sup>a,b</sup>

<sup>a</sup> Swiss Federal Institute of Sport Magglingen, Federal Office of Sport, Switzerland

<sup>b</sup> Institute of Social and Preventive Medicine, University of Zurich, Switzerland

# A walk to kindergarten project in Switzerland: needs assessment, comparison of outcome assessment methods and follow-up over three years

## Abstract

**Background:** Parents in a suburban community in Switzerland were concerned about the safety of their children when walking to kindergarten. A steering group was formed and a project started with the aim of improving conditions for safe walking to kindergarten and preventing the increase of car use for transport to kindergarten.

**Methods:** Individual interviews, group interviews and questionnaires were used to assess the needs of teachers, pupils and parents respectively. Baseline counts of kindergarten pupils arriving by car, school bus or on foot were obtained using three different methods. Counts and parent questionnaires were repeated for follow-up after one year and three years.

**Results:** The involvement of parents, teachers and kindergarten children for the needs assessment was crucial to the project implementation and acceptance. The young children's self-report as well as counts by older primary school students turned out to be reliable methods for outcome measurement. The percentage of children brought by car in the morning remained similar after one year with some reduction being observed at 3-year follow-up.

**Conclusions:** Parents, kindergarten children and school children made significant contributions to this walk to kindergarten project. To achieve their full potential, project activities have to continue over several years.

## Zusammenfassung

**Hintergrund:** In einer Schweizer Agglomerationsgemeinde rief die Verkehrssituation im Umfeld des Kindergartens die Besorgnis der Eltern hervor. Daher wurde eine Steuergruppe gebildet, welche ein Projekt mit dem Ziel, die Voraussetzungen für einen sicheren Kindergartenweg zu verbessern, ins Leben rief. Ein weiteres Ziel war zu verhindern, dass der Autoverkehr zum Kindergarten weiter zunähme.

**Methode:** Für eine Bedürfnisabklärung wurden Einzelinterviews mit Lehrpersonen, Gruppeninterviews mit Kindern und schriftliche Befragungen mit Eltern durchgeführt. Baseline-Zählungen der Kindergartenkinder, welche per Auto, Schulbus oder zu Fuss zum Kindergarten kamen, wurden mit drei verschiedenen Methoden vorgenommen. Zählungen und Elternbefragungen wurden nach ein und drei Jahren wiederholt.

**Resultate:** Der Einbezug der Eltern, Lehrpersonen und Kindergartenkinder für die Bedürfnisabklärung war entscheidend für die Durchführung und Akzeptanz des Projekts. Sowohl Eigenangaben der Kindergarten-Kinder wie auch Zählungen durch ältere Primarschulkinder bewährten sich als Messmethoden. Der Anteil der Kinder, welche morgens per Auto gebracht wurden, war nach dem ersten Jahr unverändert. Nach 3 Jahren wurde eine leichte Abnahme beobachtet.

**Schlussfolgerung:** In diesem Projekt zur Förderung eines aktiven Kindergartenwegs lieferten Eltern, Kindergartenkinder und Schüler bedeutende Beiträge. Damit das volle Potential ausgeschöpft werden kann, müssen Projektaktivitäten über mehrere Jahre aufrechterhalten werden.

Schweizerische Zeitschrift für «Sportmedizin und Sporttraumatologie» 57 (2), 51–55, 2009

## Introduction

It is a common belief that children naturally engage in a lot of physical activity. Longitudinal studies on physical activity patterns confirm that children have higher activity levels, which decline during adolescence (Bradley et al., 2000; Kimm et al., 2002; Van Mechelen et al., 2000; Telama and Yang, 2000). However, there is increasing concern that children's activity levels are continuously declining due to changes in the environment and families' lifestyles (Mackett, 2002). In the United Kingdom for instance, the proportion of children under 16 years of age travelling to school by car increased from 16% to 30% between 1985/86 and 1997/98 (Department of the Environment, 2000). In the USA, the proportion of children aged 5 to 15 years actively commuting to school declined from 48% in 1969 to 16% in 2001 (Davison et al., 2008). Projects to promote walking or cycling to school have been conducted in

various countries. While evaluations of such programmes are limited, there is some evidence that they increase active commuting to school (Davison et al., 2008).

The Swiss Micro Censuses on Travel Behaviour from the years 2000 and 2005 showed that about three quarters of the journeys to school were covered on foot among 6- to 9-year-old children, while children were taken by car for 7% to 9% of the journeys (Sauter, 2008). As increases in the use of the car to bring children to school have been observed, a number of projects such as "à pied c'est mieux" (walking is better) were initiated in Switzerland aiming to maintain the percentage of children walking to school at a high level. However, these projects did not include any outcome measurement.

In the community of Evilard on the first ridge of the Swiss Jura Mountains, parents observed increasing traffic through the narrow side street leading to the kindergarten, endangering those children

who walked there. A group was formed in order to discuss possible measures to reduce traffic in the area. It soon grew to be the steering group of a project with a wider aim: improving conditions for safe walking to kindergarten, at the same time providing access to a wide range of experiences. Parents, the school headmaster, a kindergarten teacher, a representative of the school board, and representatives of community associations were taken aboard the group. Support was also gained from the municipal council, the local traffic police, and the school physician. The Swiss Federal Institute of Sport, which is located within this community, agreed to undertake a needs assessment as a project basis and to carry out baseline and follow-up measurements of children's mode of transport to kindergarten. After baseline assessments were analysed, the aim was set to retain the low levels of car use and high levels of walking to school over the following years.

The community of Evilard is characterised by its long shape, settlements being concentrated along the main street which runs throughout the community and continues downhill to the nearest town. Overall, 60% of the 2500 inhabitants are German speaking and 40% French speaking. The school is situated near a forest about 300 metres off and slightly uphill from the main street. Side streets, partly without pedestrian pavements, lead to the school. The street leading further on to the kindergarten is particularly narrow (*figure 1*). A school bus takes children from a settlement further up the mountain to the school. About 30% of children thus have access to a school bus. Other children find their own way to school or kindergarten. There are two kindergarten classes, a German-speaking and a francophone class. Kindergarten children here, as in Switzerland in general, are 5 to 7 years old.

The aim of this article is to describe the development of the project, to discuss the methods used for assessment and to present the follow-up results over three years. More detailed documentation on the project in German can be found on the website [www.children-on-the-move.ch](http://www.children-on-the-move.ch), where this project is registered under the name: "à pied c'est cool / Sälber i Chindsgi".

## Methods

The project was not designed as a research project, but a local intervention carried out by the working group jointly with the school and village authorities. The interviews and observations to be carried out were agreed on with the teachers involved and with the headmaster; the parents were informed beforehand.

### Needs Assessment

The project aimed to base its activities on concerns and suggestions from the target group being the kindergarten pupils, their parents and their teachers. A needs assessment was therefore carried out at the start of the project.

The kindergarten teachers were interviewed by a project assistant from the Swiss Federal Institute of Sport using an interview guideline. Two teachers were interviewed together so that discussion between them could be fostered. The third teacher was not present and thus interviewed separately later. Topics covered were the role of the path to school as a transition between school and home, advantages of different means of transport to get to kindergarten, the importance of physical activity for children, specific needs or wishes for outcomes of this project, the necessity and practicability of measures suggested by the project assistant and further ideas from the teachers.

The teachers agreed to lead group discussions with the kindergarten children based on an interview guideline prepared by the project assistant. Teachers were thus advised to cover the following topics in their discussions: means to get to the kindergarten, advantage of the different alternatives, preferred choices, preferences for company on the way and ideas for improvement. During these discussions the project assistant sat in the background taking notes. Twenty-two children were attending one class and 17 the other. The teacher of the bigger class formed two equal groups and



Figure 1: Situation around kindergarten in Evilard on the first range of the Jura mountains in Switzerland

discussed the topics with each group separately, while the other group was engaged in quiet play. With the help of cards and buttons she prompted pupils to tell how they had come to class, what means they preferred, and what they liked and disliked about different means. She paid particular attention to getting every child's opinion. She then proceeded to ask about children's ideas for improvement. The second teacher decided to discuss the issue with all pupils sitting in a circle. After introducing the topic, she asked for a show of hands on how children had come and what means of transport they preferred. She then discussed reasons for their preferences and ideas for improvements along the route to school. The parents received a written questionnaire. From a list of conditions, they were prompted to tick which ones were of major importance in providing a safe and attractive route to kindergarten. They were then asked to mark which means of transport their child was using and how often. Parents were further asked about the extent to which they were concerned about the traffic situation around the kindergarten. Finally, they had the opportunity to make their own suggestions and add comments.

### Baseline assessment

A baseline assessment on modes of transport used was carried out in April/Mai 2002 before project activities began. Counts of children were taken according to three different methods as explained below. A comparison between the results of these three methods was then made in order to determine their usefulness.

One morning in class, the kindergarten pupils drew pictures of cars, buses, and people walking. During a predetermined two-week period, these pictures were hanging on a clothes line at the entrance of the kindergarten. Upon arrival in the morning, each child took a picture which corresponded to the means of transport he or she had used that day and put it in a letter box. The teacher opened the box later during the day and recorded the numbers of cards with a car, a bus or people walking. She further wrote down the number of pupils present each day.

On five set mornings during this two-week period, 4<sup>th</sup> grade students from the adjacent school were standing near the kindergarten entrance from 8.10 to 8.50 and counted the children coming from the school bus as well as the ones being brought by car. They further recorded the number of cars bringing children and cars driving past the kindergarten. In addition, a person from the evaluation team independently gathered the same information on three of these five days. Counts by the pupils and the project team were repeated at lunch time to see what means of transport children took to get home again. Children walking to and from kindergarten were not counted by the school pupils or evaluation team as preliminary tests revealed that this was a somewhat impossible task due to the fact that they were often arriving in great numbers at a time and

tended to get in and out of the building repeatedly. The number of children walking was thus calculated by deducting the number of children arriving by car or bus from the total number of children present each day.

### *Intervention measures*

In May 2002, the steering group met to analyse the needs assessment and baseline data and thus compiled a list of measures to be taken. These were then prioritised and responsibilities for each of them assigned to members of the group. The steering group continued meeting about three times a year to discuss developments. In April 2005, the steering group handed the project issues over to the parent board, the school board and the staff of the school.

A number of measures could be realised during the first six months. Firstly a chain of stones was mounted to block a corner near a pedestrian crossing at the main street, where cars had previously been parking thus impeding the view of the children crossing to walk up to kindergarten. Secondly, a call for volunteers to help children cross the street early in the morning and at lunch time was placed in the quarterly community magazine. Thirdly, an information letter was sent to parents of kindergarten children, where the main results of the parent questionnaire were presented and an appeal was made to leave the car at home or to stop further away from the kindergarten if bringing children by car. Furthermore, the Walking School Bus was presented, where groups of children walk together and pick up each child at designated "bus stops" to join the group all the way to kindergarten. Contact details of a person ready to organise the Walking School Bus were provided for parents interested in joining.

During the next six months, teachers discussed the topic with their children in kindergarten and at school. In addition, the problem of children disliking the school bus was particularly attended to. Older school children assumed the responsibility of keeping the pupils calm in the bus and paying particular attention that the kindergarten children were not bullied by other children. Furthermore, the school children set up a theatre performance that dealt with the topic of respect towards others in the school bus. Measures following during the second and third year included "no parking" road markings in front of kindergarten and weekly guided walks to kindergarten from more remote parts of the community. Furthermore, an official drop-off place further away from kindergarten ("kangaroo spot") was designated and marked with a road sign, where children could be taken by car without causing traffic around the kindergarten. From there children could then walk the last five minutes to get to school.

### *Measures implemented between 2002 and 2005*

- Information of parents and wider community (letters, village bulletin, working group, Website)
- Treatment of the issue in kindergarten and in school
- Physical prevention of car parking beside children's pedestrian crossing on village's main road
- "No parking" road markings in front of kindergarten
- Rules of behaviour in the official school bus
- Weekly guided walks to kindergarten from more remote parts of the village
- Designation of an official drop-off place further away from kindergarten ("kangaroo spot")

### *Further measures discussed but not realised until 2005*

- Official school bus stop further away from kindergarten
- "Pedibus" (walking bus)
- Traffic wardens
- Traffic signals for pedestrian crossings
- Traffic restrictions in kindergarten and school area
- Measures to increase attractiveness of children's walk to kindergarten

*Table 1:* Summary of measures agreed upon by the steering group jointly with the school and village authorities

Discussions to introduce a range of further measures, such as traffic calming measures around the kindergarten, traffic lights at pedestrian crossings of the main road, setting the official school bus stop further away from kindergarten and measures to increase the attractiveness of children's walk to kindergarten were also started.

### *Follow-up measurements*

Children's self-reports were repeated in September '02, April '03 and Mai '05. Counts were repeated by the 4<sup>th</sup> grade primary school students in September '02 and April '03, and by the evaluation team in Mai '05. Parent questionnaires were repeated in April '03 and April '05. Included in the analysis of self-reports and counts were the days on which both were available. The September '02 data were excluded as there were only two days of complete data available and seasonal changes may also have influenced the results. T-tests (two-tailed) or Chi<sup>2</sup> tests were used to compare baseline counts with follow-up counts at one year and three years. As some of the cells were too small, no Chi<sup>2</sup> tests were calculated for the proportions from the parents' questionnaire.

## **Results**

### *Needs Assessment*

Teachers were willing to co-operate in project activities but clearly wanted the parent group to be the driving force. They raised concerns about the main street, where cars were speeding and not stopping for pedestrians. To them, the most important aspect of the children's walk to school was a slow transition between home and the "work place", which allowed the children to focus their minds on the school day ahead of them.

The children expressed their ideas and opinions freely. The interviews revealed that walking to school as well as being brought by car were popular among the children. Many did, however, dislike the ride in the school bus, mainly due to the older children's behaviour on the bus. The children voiced some concern about cars disturbing them on the narrow streets leading to kindergarten. Of the 40 questionnaires sent to the parents, 33 (83%) were returned. 55% of parents saw motorised traffic around kindergarten as a moderate or a big problem. Problems of visibility at the pedestrian crossings over the main street and the speed of cars were the main concerns raised. More than half the parents added further comments and suggestions at the end of the questionnaire.

### *Comparison of baseline assessment methods*

Table 2 shows the counts on what mode of transport children were using to get to kindergarten. All three measurement methods are shown: the pictures put into the letter box by the kindergarten children, the counts taken by the 4th grade pupils and counts by the evaluation team.

A comparison of the three counting methods shows generally good agreement, yet differences of up to three counts did occur. No persistent pattern of differences could be determined.

### *Outcome measurements*

Figure 2 shows the average proportion of children being brought by car in the morning according to self-report as well as to counts at baseline, after one year and after three years. In addition, the number of cars dropping off children is shown as observed. While no significant changes were observed for both follow-up times according to self-report, counts revealed a significant reduction after three years for the number of children being dropped off as well as the number of cars dropping off children.

In the 2002 questionnaires, 15% of parents reported that children were usually taken to kindergarten by car. For 2003 and 2005 this figure was 5% and 0% respectively. The proportion of parents

Date	Total number of children at kindergarten	Counting carried out by	Number of children by car	Number of children by bus	Number of children walking
23/4/02	40 (indicated by teachers)	Kindergarten children, school children, evaluation team	5 5 4	16 14 14	19 — —
24/4/02	40 (indicated by teachers)	Kindergarten children, school children, evaluation team	3 6 5	13 14 15	20 — —
25/4/02	24 (indicated by teachers)	Kindergarten children, school children, evaluation team	1 3 —	10 9 —	13 — —
30/4/02	41 (indicated by teachers)	Kindergarten children, school children, evaluation team	8 5 —	13 14 —	20 — —
3/5/02	39 (indicated by teachers)	Kindergarten children, school children, evaluation team	9 9 8	13 12 13	17 — —

Table 2: Counts of children arriving at kindergarten according to the three different groups: Kindergarten children: self report using cards; school children: observation; evaluation team: simultaneous observation.

seeing motorised traffic around kindergarten as a problem was 55% in 2003 and 79% in 2005. Participation in the questionnaire survey was 50% and 59% in those two years.

## Discussion

In this project, valuable information from the needs assessment and baseline measurements was used by the steering group to initiate a number of intervention measures. Support in promoting safe and enjoyable opportunities to walk to kindergarten was given by parents and the whole school. Children's self-report about the mode of transport to school yielded similar results as counts of primary school children and counts by the evaluation team. This small-scale project was not designed as a research project and thus did not include a control group. However, follow-up measurements over three years indicate that the aim of maintaining car use at a low level was more than achieved.

A range of project measures could be implemented during the three years, others, particularly measures including structural changes, need more time and involvement of other parties and au-

thorities. A strong support from the parents was observed throughout the project which is important for empowering the kindergarten teachers and school as a whole in their work with the children to promote active commuting. Indeed, a recent review identified the parents' positive attitude and perception as a major predictor for active commuting in children (Davison et al., 2008).

### Needs assessment

The interviews with the teachers provided a valuable basis for a work relationship. They brought forth the teachers' general stand on the issue and what problems and possible solutions were most at their hearts. It proved to be beneficial to interview two teachers together as further discussion was thus stimulated by the comments from each of them.

Having kindergarten teachers elicit children's responses (according to an interview guide written by project staff) appeared to be essential as children thus felt free and confident to share their opinions. In both classes, the teacher skilfully fostered the children's desire to contribute. In the smaller groups, every child got to express his or her thoughts while this was not possible in the big group.

The parent questionnaire was appreciated, though participation dropped after the first run. The traffic situation around the kindergarten was of concern to the majority of parents at baseline and at follow-up. Their interest in the issue was also reflected by the fact that a lot of parents made use of the opportunity to add further comments, to raise concerns or to provide suggestions.

### Comparison of baseline assessment methods

This study aimed to test simple assessment methods which could be commonly used for kindergarten and school projects. Therefore, kindergarten children were asked to give self-reports, primary school children were taking counts at the same time and people from the evaluation team took separate counts for comparison.

The kindergarten pupils diligently attended to their task of putting picture cards into the letter box. Only on one morning during the two week period, the total number of cards put in the letter box did not correspond to the total number of children recorded as present by the teacher. Two problems that appeared with this method were a picture of a car that could also be taken for a bus and the possibility that the kindergarten children might have a tendency to take a picture that they drew themselves irrespective of what mode of transport it showed.

The school children worked in groups of four each time with two being responsible for the counts of children from the bus and the other two for the cars and number of children getting out of cars. This method generally appeared to work very well. However, few groups made an unmotivated impression and may thus not have counted correctly. This might explain the variations in discrepancies between student counts and children's pictures. A number of

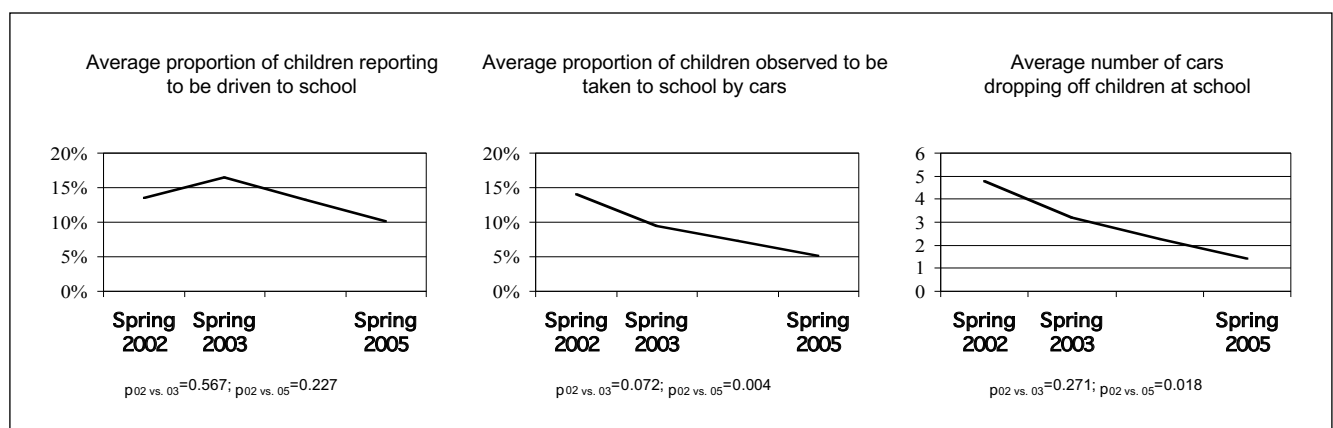


Figure 2: Development of car transport to kindergarten in the morning from 2002 to 2005 (5 days in Spring '02, 6 days in Spring '03 and 5 days in Spring '05).

students also reported that they had been getting negative remarks from one or two parents when they did the second follow-up counts.

The people from the evaluation team were working alone on each occasion and thus reported occasional difficulties in properly counting cars, children from cars, and children from the bus at the same time. Further differences between reports from the kindergarten pupils and actual counts may also have arisen when pupils were brought by car but got out further away from the kindergarten and walked over from there.

All three methods applied for baseline measurements of modes of transport proved to be useful, yet each of them brought along minor drawbacks. Specific measures to increase the school children's motivation might have helped in providing more accurate counts. The evaluators should have performed their counts in teams of two to prevent missing out counts. The kindergarten children's picture cards should have been checked through to assure that there are no equivocal pictures. In any case, involving both the kindergarten and the school pupils for the assessment created a widespread awareness of the project to be launched.

#### *Outcome measurements*

Percentages of children being brought by car in the morning remained similar over the three years according to children's self-report. Counts revealed some reduction at 3-year follow-up. Over roughly the same time span, data from the Swiss Micro Censuses on Travel Behaviour showed no increase in the use of cars to get 6- to 9-year-old children to school from the years 1994 to 2005 (Sauter, 2008).

The results from the parents' questionnaire were pointing in the same direction as the counts, but have to be interpreted with caution because of dropping participation and possible increases in social desirability.

It is to be noted that percentages of children being taken by car were already small at baseline – thus the aim was to maintain them at this low level, which was achieved over the three year project period.

While a range of walk to school projects have been conducted in several countries, very few of them have included some sort of outcome measurement (Davison et al., 2008). A comparison between their results and the results of this project is not possible, as baseline levels and age groups involved are different.

#### *Conclusions*

A thorough needs assessment involving mediators and the target group is essential for the implementation and acceptance of a walk to school project. For outcome measurement, kindergarten children themselves as well as older primary school students are able to conduct accurate assessments of modes of transport if proper arrangements are made and clear instructions are given. Simple

measures to reduce traffic around the kindergarten such as information letters and treatment of the issue at school may have some impact yet more extensive measures such as road markings and traffic calming measures may be needed and desired by parents and teachers. Such measures, in turn, require long-term advocacy and planning thus project activities have to continue over several years.

#### **Acknowledgements**

We would like to thank the following people for their support in planning, conducting and evaluating this project:

- Members of the steering group: Pascal Bourban, Cornelia Dörfler, Simone Helg, Bernhard Hotz, Silke op de Hipt, Pierre Meylan, Barbara Nünlist, Sibylle Stauffer
- The kindergarten teachers
- 4<sup>th</sup> grade students, who devoted their time to counting children around kindergarten
- Alain Sigfried and Thomas Wyss

Address for correspondence:

Gerda Jimmy, Swiss Federal Institute of Sport Magglingen, CH-2532 Magglingen, Switzerland, tel: +41 32 327 6517, e-mail: gerda.jimmy@baspo.admin.ch

#### **References**

- Bradley C.B., McMurray R.G., Harrell J.S., Deng S. (2000): Changes in common activities of 3rd through 10th graders: the CHIC study. *Med. Sci. Sports. Exerc.* 32: 71–78.
- Davison K.K., Werder J.L., Lawson, C.T. (2008): Children's active commuting to school: Current knowledge and future directions. *Prev. Chronic. Dis.* 5(3):A100.
- Department of the Environment, Transport and the Regions (2000): National Travel Survey. HMSO, London.
- Kimm S.Y., Glynn N.W., Kriska A.M., Barton B.A., Kronsberg S.S., Daniels S.R., Crawford P.B., Sabry Z.I., Liu K. (2002): Decline in physical activity in black girls and white girls during adolescence. *N. Engl. J. Med.* 347: 709–715.
- Mackett R. (2002): Increasing car dependency of children: should we be worried. *Proceedings of the institution of civil engineers-municipal engineer.* 151: 29–38.
- Sauter D. (2008): Mobilität von Kindern und Jugendlichen – Fakten und Trends aus den Mikrozensen zum Verkehrsverhalten 1994, 2000 und 2005. [Mobility among children and adolescents – facts and trends from the Swiss micro censuses on modes of transport 1994, 2000 and 2005.] Bundesamt für Strassen, Bern.
- Telama R., Yang X. (2000): Decline of physical activity from youth to young adulthood in Finland. *Med. Sci. Sports. Exerc.* 32: 1617–1622.
- Van Mechelen W., Twisk J.W., Post G.B., Snel J., Kemper H.C. (2000): Physical activity of young people: the Amsterdam Longitudinal Growth and Health Study. *Med. Sci. Sports. Exerc.* 32: 1610–1616.